

TOP E0 "Z System E0

FIG.1

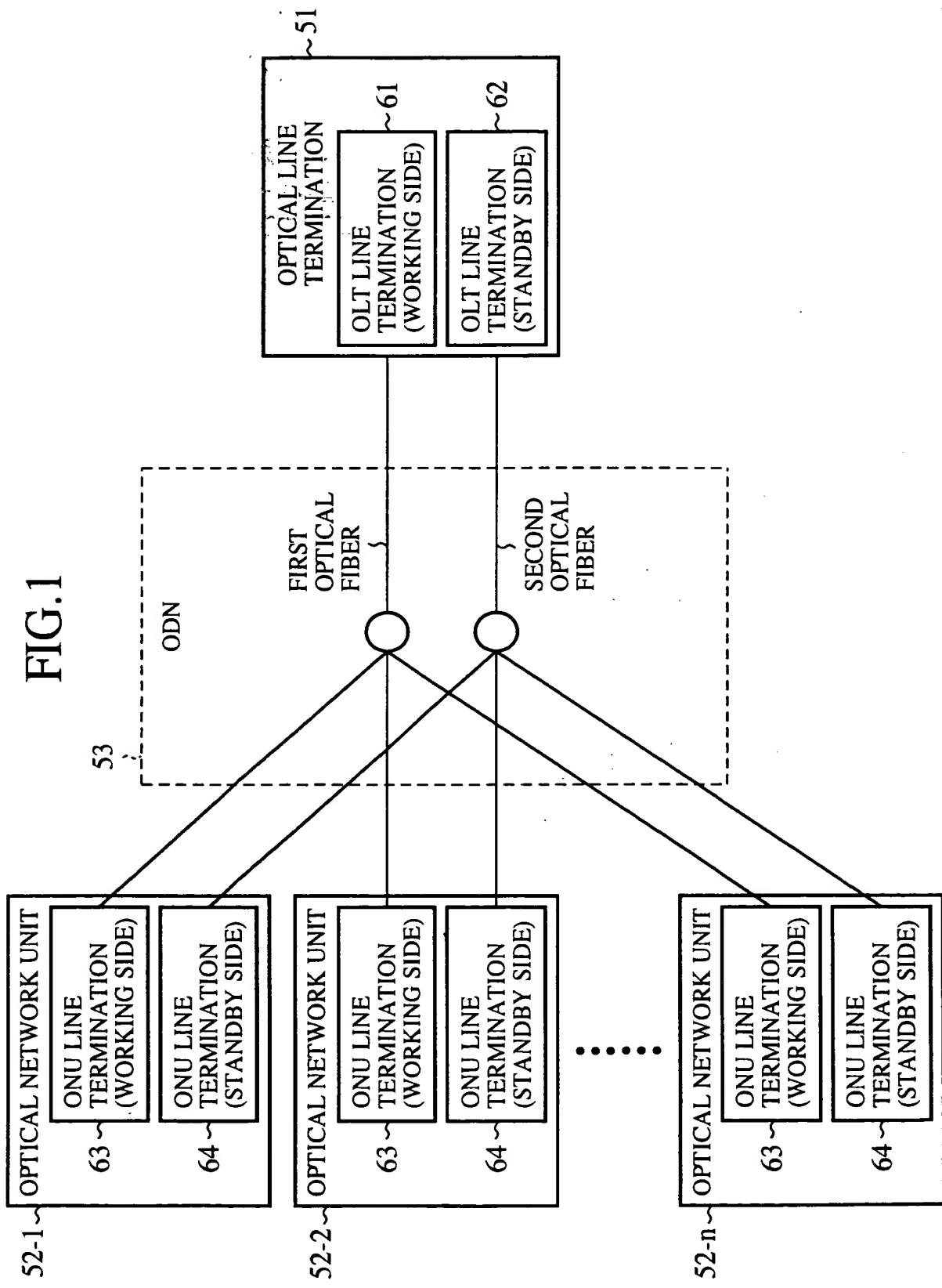


FIG.2

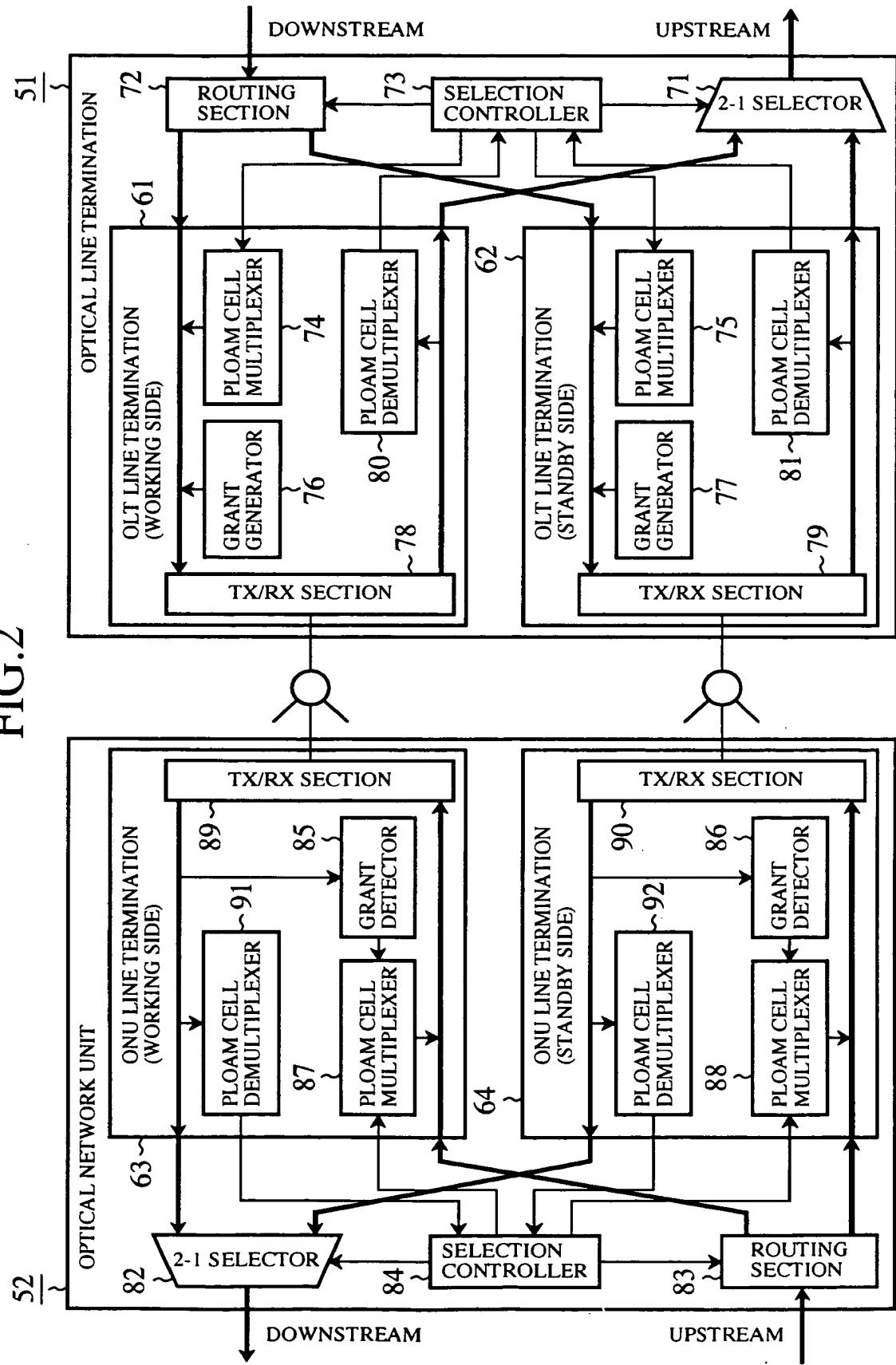


FIG.3

CONTROL EXAMPLE (NON-REVERTIVE MODE)

FAULT STATE	OLT TO OLT			OPERATION		
	K1 BYTE	K2 BYTE	K1 BYTE	K2 BYTE	ONU	OLT
NO FAILURE	(ONU IS) SELECTING WS	NO SW REQ.	(ONU IS) SELECTING WS	(OLT IS) SELECTING WS	SL IS OPERATING IN WS	SL IS WORKING AT WS ~ S11
EQUIPMENT FAILURE OCCURS IN WS TX/RX OF ONU	SW REQ. BY WORKING SF	NO SW REQ.	(ONU IS) SELECTING WS	(OLT IS) SELECTING WS	DETECT SW REQ. BY WORKING SF; SL IS WORKING AT WS; UPDATE T-K1 BYTE	SL IS WORKING AT WS ~ S12
	SW REQ. BY WORKING SF	NO SW REQ.	(ONU IS) SELECTING WS	(OLT IS) SELECTING SS	DETECT SW REQ. BY WORKING SF; SL IS WORKING AT WS; UPDATE T-K1 BYTE	DETECT RR BY RECEIVING K1/K2; SL IS SWITCHED TO SS; UPDATE T-K2 BYTE ~ S13
	SW REQ. BY WORKING SF	NO SW REQ.	(ONU IS) SELECTING SS	(OLT IS) SELECTING SS	DETECT RR BY RECEIVING K2; SL IS SWITCHED TO SS; UPDATE T-K2 BYTE	DETECT RR BY RECEIVING K1/K2; SL IS SWITCHED TO SS; UPDATE T-K2 BYTE ~ S14
EQUIPMENT FAILURE IS RESTORED IN WS TX/RX OF ONU	DO NOT REVERT TO WS	(ONU IS) SELECTING SS	NO SW REQ.	(OLT IS) SELECTING SS	DETECT SW REQ. CLEAR; DO NOT REVERT STATE; UPDATE T-K1 BYTE	DETECT RR BY RECEIVING K1/K2; SL IS SWITCHED TO SS; UPDATE T-K2 BYTE ~ S15
SIGNAL DEGRADE OCCURS IN SS TX/RX OF ONU	SW REQ. BY STANDBY SD	(ONU IS) SELECTING SS	NO SW REQ.	(OLT IS) SELECTING SS	DETECT SW REQ. BY WS SD; SL IS OPERATING AT SS; UPDATE T-K1 BYTE	DETECT RR BY RECEIVING K1/K2; SL IS SWITCHED TO SS; UPDATE T-K2 BYTE ~ S16
	SW REQ. BY STANDBY SD	(ONU IS) SELECTING SS	NO SW REQ.	(OLT IS) SELECTING WS	DETECT SW REQ. BY WS SD; SL IS OPERATING AT SS; UPDATE T-K1 BYTE	DETECT RR BY RECEIVING K1/K2; SL IS SWITCHED TO WS; UPDATE T-K2 BYTE ~ S17

FIG.4

SIGNAL DEGRADE OCCURS IN SS TX/RX OF ONU	SW REQ. BY STANDBY SD	(ONU IS) SELECTING WS	NO SW REQ.	(OLT IS) SELECTING WS	DETECT RR BY RECEIVING K2; SL IS SWITCHED TO WS; UPDATE T-K2 BYTE	DETECT RR BY RECEIVING K1/K2; SL IS SWITCHED TO WS; UPDATE T-K2 BYTE
SIGNAL DEGRADE IS RESTORED IN SS TX/RX OF ONU	NO SW REQ.	(ONU IS) SELECTING WS	NO SW REQ.	(OLT IS) SELECTING WS	NO REQ.; UPDATE K1 BYTE	DETECT RR BY RECEIVING K1/K2; SL IS SWITCHED TO WS; UPDATE T-K2 BYTE

NOTES: WS = WORKING SIDE

SS = STANDBY SIDE

TX/RX = TRANSMITTING AND RECEIVING SECTION

ONU = OPTICAL NETWORK UNIT

OLT = OPTICAL LINE TERMINATION

SW = SWITCH OR SWITCHING

REQ. = REQUEST

SF = SIGNAL FAIL

SD = SIGNAL DEGRADE

T-K1 = TRANSMISSION K1 BYTE

T-K2 = TRANSMISSION K2 BYTE

RR = REMOTE REQUEST

SL = SELECTOR

FIG.5

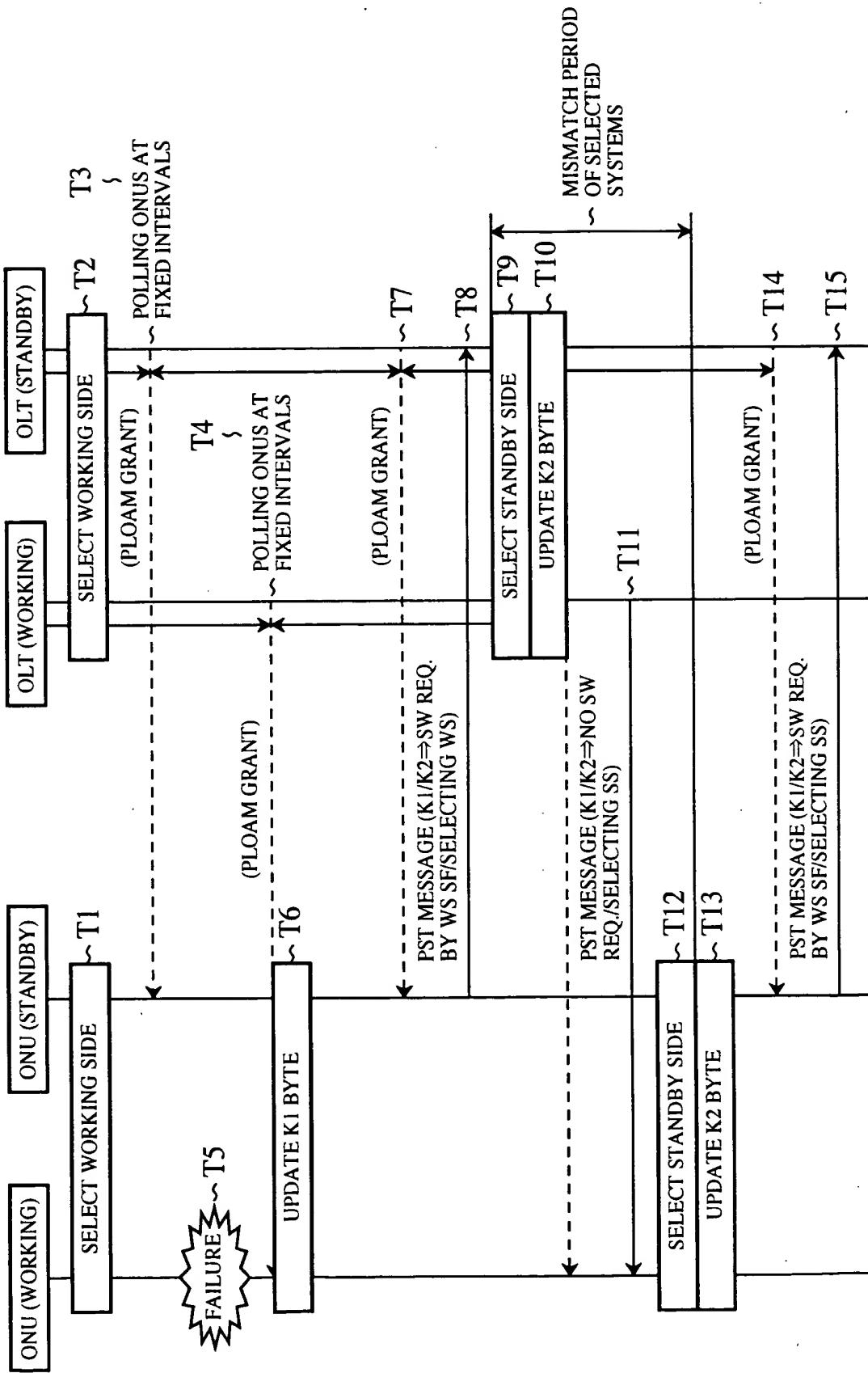
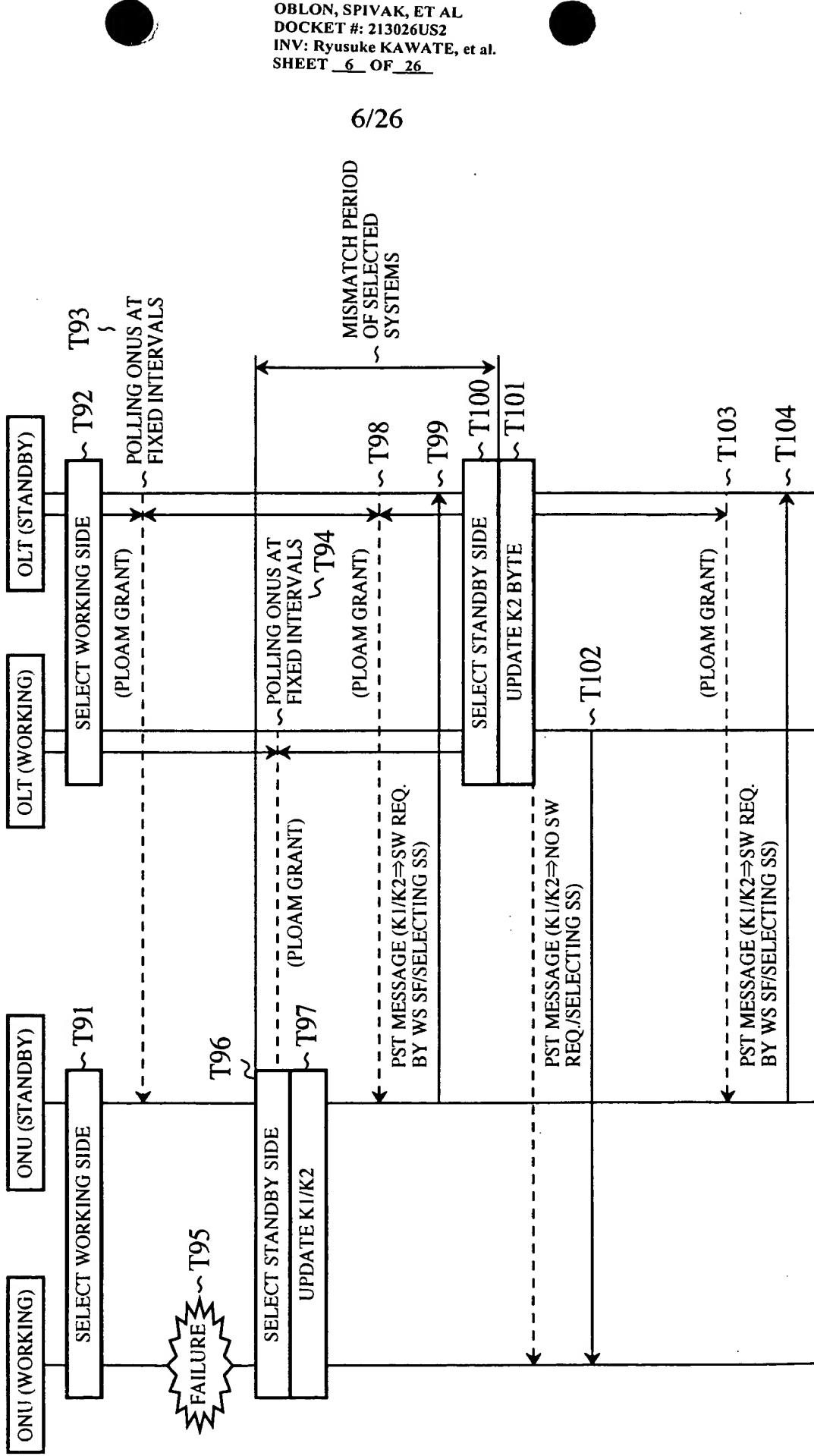


FIG.6

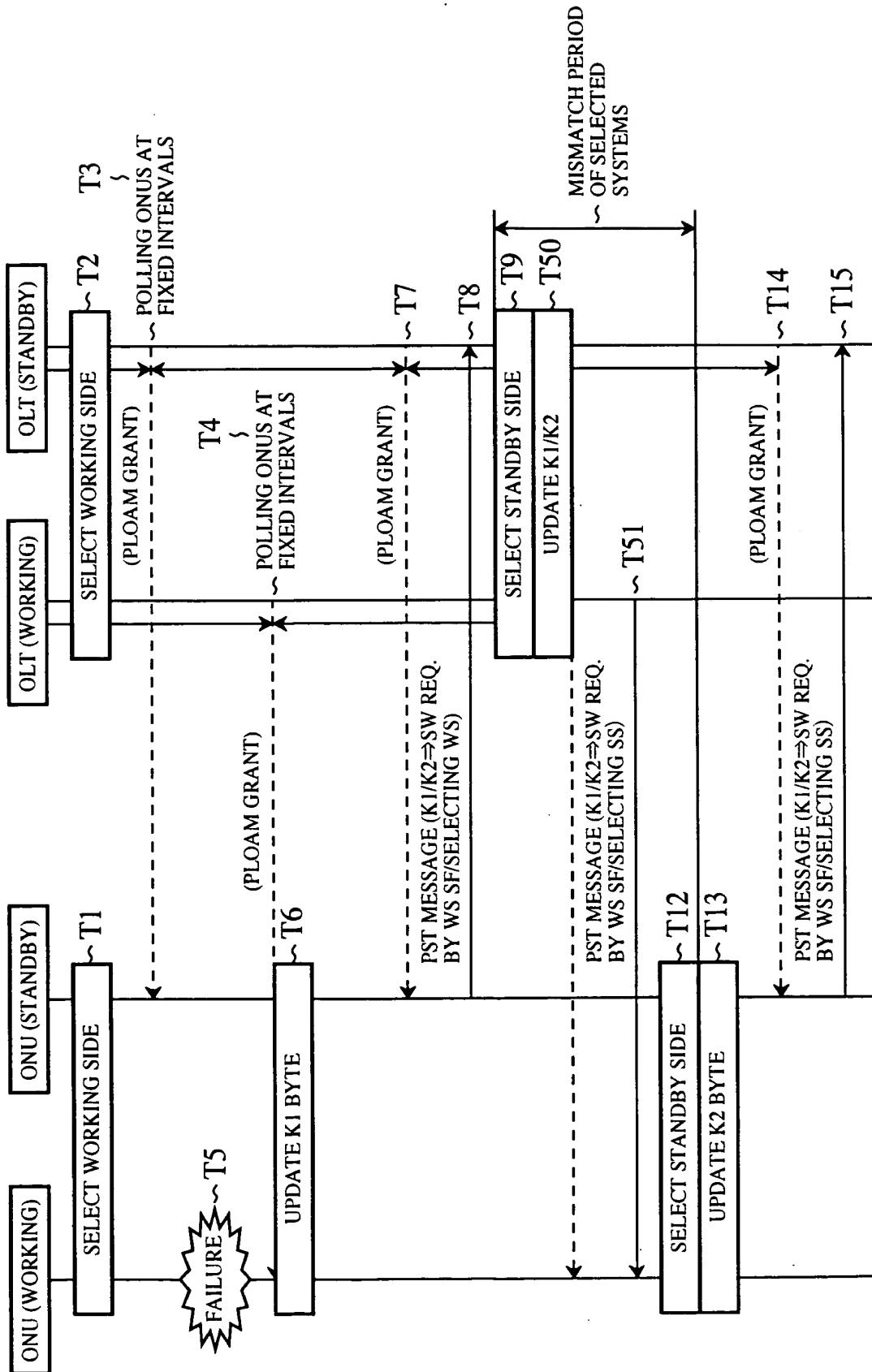


CONTROL EXAMPLE (REVERTIVE MODE)

FIG. 7

FAULT STATE	ONU TO OLT				OLT TO ONU		OPERATION	
	K1 BYTE	K2 BYTE	K1 BYTE	K2 BYTE	ONU	ONU	OLT	OLT
NO FAILURE	NO SW REQ.	(ONU IS) SELECTING WS	NO SW REQ.	(OLT IS) SELECTING WS	SL IS OPERATING IN WS	SL IS WORKING AT WS	~ S11	
	SW REQ. BY WORKING SF	(ONU IS) SELECTING WS	NO SW REQ.	(OLT IS) SELECTING WS	DETECT SW REQ. BY WORKING SF; SL IS WORKING AT WS; UPDATE T-K1 BYTE	SL IS WORKING AT WS	~ S12	
EQUIPMENT FAILURE OCCURS IN WS TX/RX OF ONU	SW REQ. BY WORKING SF	(ONU IS) SELECTING WS	NO SW REQ.	(OLT IS) SELECTING SS	DETECT SW REQ. BY WORKING SF; SL IS WORKING AT WS; UPDATE T-K1 BYTE	SL IS WORKING AT WS	~ S13	
	SW REQ. BY WORKING SF	(ONU IS) SELECTING SS	NO SW REQ.	(OLT IS) SELECTING SS	DETECT RR BY RECEIVING K1/K2; SL IS SWITCHED TO SS; UPDATE T-K2 BYTE	DETECT RR BY RECEIVING K1/K2; SL IS SWITCHED TO SS; UPDATE T-K2 BYTE	~ S14	
	REQUESTING TO REVERT TO WS	(ONU IS) SELECTING SS	NO SW REQ.	(OLT IS) SELECTING SS	DETECT RR BY RECEIVING K2; SL IS SWITCHED TO SS; UPDATE T-K2 BYTE	DETECT RR BY RECEIVING K1/K2; SL IS SWITCHED TO SS; UPDATE T-K2 BYTE	~ S14	
EQUIPMENT FAILURE IS RESTORED IN WS TX/RX OF ONU	WAITING TO REVERT TO WS	(ONU IS) SELECTING SS	NO SW REQ.	(OLT IS) SELECTING SS	DETECT SW REQ. CLEAR; WAIT TO REVERT STATE; UPDATE T-K1 BYTE	START RESTORE TIMER; SL IS OPERATING AT SS	~ S21	
	REVERSION WAITING EXPIRES AT OLT	(ONU IS) SELECTING WS	NO SW REQ.	(OLT IS) SELECTING WS	DETECT SW REQ. CLEAR; WAIT TO REVERT STATE; UPDATE T-K1 BYTE	STOP RESTORE TIMER; SL IS SWITCHED TO WS; UPDATE T-K2 BYTE	~ S22	
		(ONU IS) SELECTING WS	NO SW REQ.	(OLT IS) SELECTING WS	DETECT RR BY RECEIVING K2; SL IS SWITCHED TO WS; UPDATE K1 BYTE	STOP RESTORE TIMER; SL IS SWITCHED TO WS; UPDATE T-K2 BYTE	~ S23	

FIG.8



9/26

FIG. 9

CONTROL EXAMPLE (NON-REVERTIVE MODE)

FAULT STATE	ONU TO OLT			OLT TO ONU			OPERATION	
	K1 BYTE	K2 BYTE	K1 BYTE	K2 BYTE	ONU	ONU	OLT	OLT
NO FAILURE	(ONU IS) WS	NO SW REQ.	(ONU IS) WS	(OLT IS) SELECTING WS	SL IS OPERATING IN WS	SL IS WORKING AT WS	~S11	
	SW REQ. BY WORKING SF	(ONU IS) SELECTING WS	NO SW REQ.	(OLT IS) SELECTING WS	DETECT SW REQ. BY WORKING SF; SL IS WORKING AT WS; UPDATE T-K1 BYTE	SL IS WORKING AT WS	~S12	
EQUIPMENT FAILURE OCCURS IN WS TX/RX OF ONU	SW REQ. BY WORKING SF	(ONU IS) SELECTING WS	SW REQ. BY WORKING SF	(OLT IS) SELECTING SS	DETECT SW REQ. BY WORKING SF; SL IS WORKING AT WS; UPDATE T-K1 BYTE	DETECT RR BY RECEIVING K1/K2; SL IS SWITCHED TO SS; UPDATE T-K1/K2 BYTES	~S13'	
	SW REQ. BY WORKING SF	(ONU IS) SELECTING SS	SW REQ. BY WORKING SF	(OLT IS) SELECTING SS	DETECT RR BY RECEIVING K1/K2; SL IS SWITCHED TO SS; UPDATE T-K1/K2 BYTES	DETECT RR BY RECEIVING K1/K2; SL IS SWITCHED TO SS; UPDATE T-K1/K2 BYTES	~S14'	
	DO NOT REVERT TO WS	(ONU IS) SELECTING SS	SW REQ. BY WORKING SF	(OLT IS) SELECTING SS	DETECT SW REQ. CLEAR; UPDATE T-K1 BYTE; DO NOT REVERT STATE	DETECT RR BY RECEIVING K1/K2; SL IS SWITCHED TO SS; UPDATE T-K1/K2 BYTES	~S15'	
EQUIPMENT FAILURE IS RESTORED IN WS TX/RX OF ONU	DO NOT REVERT TO WS	(ONU IS) SELECTING SS	DO NOT REVERT TO WS	(OLT IS) SELECTING SS	DETECT SW REQ. CLEAR; UPDATE T-K1 BYTE; DO NOT REVERT STATE	DETECT RR RELEASE BY RECEIVING K1/K2; DO NOT REVERT STATE; UPDATE T-K1 BYTE	~S15"	
SIGNAL DEGRADE	SW REQ. BY STANDBY SD	(ONU IS) SELECTING SS	DO NOT REVERT TO WS	(OLT IS) SELECTING SS	DETECT SW REQ. BY WS SD; SL IS OPERATING AT SS; UPDATE T-K1 BYTE	DETECT RR RELEASE BY RECEIVING K1/K2; DO NOT REVERT STATE; UPDATE T-K1 BYTE	~S16'	

FIG. 10

SIGNAL DEGRADE OCCURS IN SS TX/RX OF ONU	SW REQ. BY STANDBY SD	(ONU IS) SELECTING SS	SW REQ. BY STANDBY SD	(OLT IS) SELECTING WS	DETECT SW REQ. BY WS SD; SL IS OPERATING AT SS; UPDATE T-K1 BYTE	DETECT RR BY RECEIVING K1/K2; SL IS SWITCHED TO WS; UPDATE T-K1/K2 BYTES	~S17'
	SW REQ. BY STANDBY SD	(ONU IS) SELECTING WS	SW REQ. BY STANDBY SD	(OLT IS) SELECTING WS	DETECT RR BY RECEIVING K1 AND K2; SL SWITCHED TO WS; UPDATE T-K2 BYTE	DETECT RR BY RECEIVING K1/K2; SL IS SWITCHED TO WS; UPDATE T-K1/K2 BYTES	~S18'
SIGNAL DEGRADE IS RESTORED IN SS TX/RX OF ONU	NO SW REQ.	(ONU IS) SELECTING WS	SW REQ. BY STANDBY SD	(OLT IS) SELECTING WS	NO REQ.; UPDATE K1 BYTE	DETECT RR BY RECEIVING K1/K2; SL IS SWITCHED TO WS; UPDATE T-K1/K2 BYTES	~S19'
	NO SW REQ.	(ONU IS) SELECTING WS	NO SW REQ.	(OLT IS) SELECTING WS	NO REQ.; UPDATE K1 BYTE	NO REQ.; UPDATE K1 BYTE	~S19"

11/26

FIG. 11

CONTROL EXAMPLE (REVERTIVE MODE)

FAULT STATE	ONU TO OLT	OLT TO ONU	OPERATION
	K1 BYTE	K2 BYTE	OLT
NO FAILURE	(ONU IS) SELECTING WS	NO SW REQ.	(OLT IS) SELECTING WS
	SW REQ. BY WORKING SF	NO SW REQ.	(OLT IS) SELECTING WS
EQUIPMENT FAILURE OCCURS IN WS TX/RX OF ONU	(ONU IS) SELECTING WS	SW REQ. BY WORKING SF	DETECT SW REQ. BY WORKING SF; SL IS WORKING AT WS; UPDATE T-K1 BYTE
	SW REQ. BY WORKING SF	(ONU IS) SELECTING SS	DETECT SW REQ. BY WORKING SF; SL IS WORKING AT WS; UPDATE T-K1 BYTE
	(ONU IS) SELECTING SS	SW REQ. BY WORKING SF	DETECT RR BY RECEIVING K1/K2; SL IS SWITCHED TO SS; UPDATE T-K1/K2 BYTES
	REQUESTING TO REVERT TO WS	(ONU IS) SELECTING SS	DETECT RR BY RECEIVING K1/K2; SL IS SWITCHED TO SS; UPDATE T-K1/K2 BYTES
EQUIPMENT FAILURE IS RESTORED IN WS TX/RX OF ONU	REQUESTING TO REVERT TO WS	REQUESTING TO REVERT TO WS	DETECT RR RELEASE BY RECEIVING K1/K2; WAIT TO REVERT STATE; START RESTORE TIMER; UPDATE T-K1 BYTE
		(OLT IS) SELECTING SS	DETECT SW REQ. CLEAR; UPDATE T-K1 BYTE
			DETECT SW REQ. CLEAR; UPDATE T-K1 BYTE

12/26

FIG.12

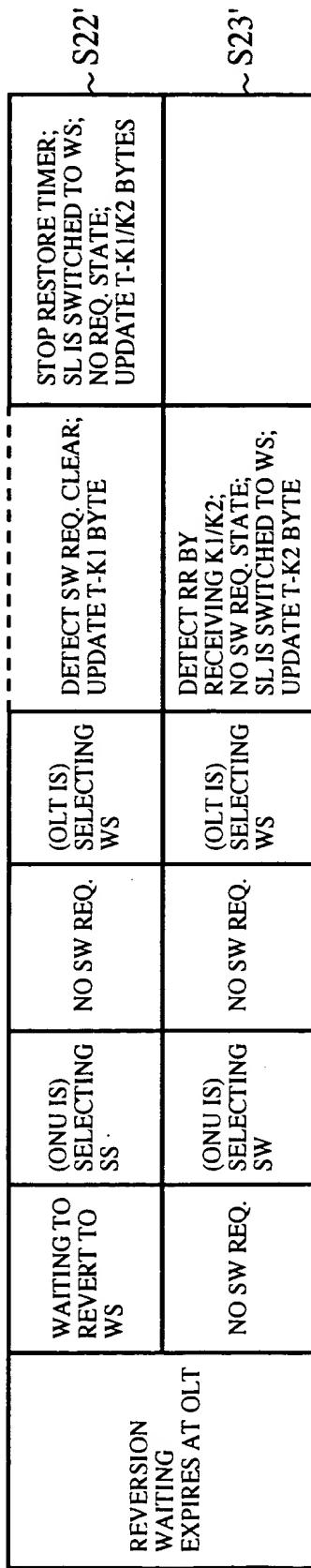


FIG. 13

FAULT STATE	ONU TO OLT	OLT TO ONU	ONU	OPERATION
	K1 BYTE	K2 BYTE	K1 BYTE	K2 BYTE
NO FAILURE	(ONU) ESTABLISHES ITS ROUTE TO WS	NO SW REQ.	(OLT) ESTABLISHES ITS ROUTE TO WS	ROUTER AND SL ARE OPERATING AT WS
	(ONU) ESTABLISHES ITS ROUTE TO WS	NO SW REQ.	(OLT) ESTABLISHES ITS ROUTE TO WS	DETECT SW REQ. BY WORKING SF; SL IS WORKING AT WS; UPDATE T-K1 BYTE
	SW REQ. BY WORKING SF	NO SW REQ.	(OLT) ESTABLISHES ITS ROUTE TO WS	DETECT SW REQ. BY WORKING SF; SL IS WORKING AT WS; UPDATE T-K1 BYTE
	SW REQ. BY WORKING SF	ACK	(OLT) ESTABLISHES ITS ROUTE TO SS	DETECT RR BY RECEIVING K1/K2 BYTES; ROUTER IS SWITCHED TO SS; UPDATE T-K1/K2 BYTES
EQUIPMENT FAILURE OCCURS IN WS TX/RX OF ONU	(ONU) ESTABLISHES ITS ROUTE TO SS	ACK	(OLT) ESTABLISHES ITS ROUTE TO SS	DETECT RR BY RECEIVING K1/K2 BYTES; SL IS SWITCHED TO SS; ROUTER IS SWITCHED TO SS; UPDATE T-K2 BYTE
	SW REQ. BY WORKING SF	ACK	(OLT) ESTABLISHES ITS ROUTE TO SS	DETECT RR BY RECEIVING K1/K2 BYTES; SL IS SWITCHED TO SS; ROUTER IS SWITCHED TO SS; UPDATE T-K2 BYTE
	(ONU) ESTABLISHES ITS ROUTE TO SS	ACK	(OLT) ESTABLISHES ITS ROUTE TO SS	DETECT RR BY RECEIVING K1/K2 BYTES; SL IS SWITCHED TO SS; UPDATE T-K2 BYTE
EQUIPMENT FAILURE IS RESTORED IN WS TX/RX OF ONU	DO NOT REVERT TO WS	ACK	(OLT) ESTABLISHES ITS ROUTE TO SS	DETECT SW REQ. CLEAR; DO NOT REVERT STATE; UPDATE T-K1 BYTE

FIG.14

SIGNAL DEGRADE OCCURS IN SS TX/RX OF ONU	SW REQ. BY STANDBY SD	(ONU) ESTABLISHES ITS ROUTE TO SS	NO SW REQ.	(OLT) ESTABLISHES ITS ROUTE TO SS	DETECT SW REQ. BY WS SD; SL IS OPERATING AT SS; UPDATE T-K1 BYTE	DETECT RR BY RECEIVING K1/K2 BYTES; SL IS SWITCHED TO SS	~S37
	SW REQ. BY STANDBY SD	((ONU) ESTABLISHES ITS ROUTE TO SS	ACK	(OLT) ESTABLISHES ITS ROUTE TO WS	DETECT SW REQ. BY WS SD; SL IS OPERATING AT SS; UPDATE T-K1 BYTE	DETECT RR BY RECEIVING K1/K2 BYTES; ROUTER IS SWITCHED TO SS; UPDATE T-K1/K2 BYTES	~S38
	SW REQ. BY STANDBY SD	(ONU) ESTABLISHES ITS ROUTE TO WS	ACK	(OLT) ESTABLISHES ITS ROUTE TO WS	DETECT RR BY RECEIVING K1/K2 BYTES; SL IS SWITCHED TO SS; ROUTER IS SWITCHED TO SS; UPDATE T-K1/K2 BYTES	DETECT RR BY RECEIVING K1/K2 BYTES; ROUTER IS SWITCHED TO SS; UPDATE T-K1/K2 BYTES	~S39
	SW REQ. BY STANDBY SD	(ONU) ESTABLISHES ITS ROUTE TO WS	ACK	(OLT) ESTABLISHES ITS ROUTE TO WS	DETECT RR BY RECEIVING K1/K2 BYTES; SL IS SWITCHED TO SS; ROUTER IS SWITCHED TO SS; UPDATE T-K2 BYTE	DETECT RR BY RECEIVING K1/K2 BYTES; SL IS SWITCHED TO SS; ROUTER IS SWITCHED TO SS; UPDATE T-K2 BYTE	~S40
	NO SW REQ.	(ONU) ESTABLISHES ITS ROUTE TO WS	ACK	(OLT) ESTABLISHES ITS ROUTE TO WS	DETECT RR BY RECEIVING K1/K2 BYTES; SL IS SWITCHED TO SS	DETECT RR BY RECEIVING K1/K2 BYTES; SL IS SWITCHED TO SS	~S41
	SIGNAL DEGRADE IS RESTORED IN SS TX/RX OF ONU	NO SW REQ.	(ONU) ESTABLISHES ITS ROUTE TO WS	NO SW REQ.	(OLT) ESTABLISHES ITS ROUTE TO WS	NO REQ.; UPDATE K1 BYTE	NO REQ.; UPDATE K1 BYTE

FIG.15

FAULT STATE	ONU TO OLT				OLT TO ONU		OPERATION	
	K1 BYTE	K2 BYTE	K1 BYTE	K2 BYTE	ONU	OLT	ONU	OLT
NO FAILURE	NO SW REQ.	(ONU) ESTABLISHES ITS ROUTE TO WS	NO SW REQ.	(OLT) ESTABLISHES ITS ROUTE TO WS	ROUTER AND SL ARE OPERATING AT WS	ROUTER AND SL ARE OPERATING AT WS	~S31	
	SW REQ. BY WORKING SF	(ONU) ESTABLISHES ITS ROUTE TO WS	NO SW REQ.	(OLT) ESTABLISHES ITS ROUTE TO WS	DETECT SW REQ. BY WORKING SF; SL IS WORKING AT WS; UPDATE T-K1 BYTE	DETECT SW REQ. BY WORKING SF; SL IS WORKING AT WS; UPDATE T-K1 BYTE	~S32	
	SW REQ. BY WORKING SF	(ONU) ESTABLISHES ITS ROUTE TO WS	ACK	(OLT) ESTABLISHES ITS ROUTE TO SS	DETECT SW REQ. BY WORKING SF; SL IS WORKING AT WS; UPDATE T-K1 BYTE	DETECT RR BY RECEIVING K1/K2 BYTES; ROUTER IS SWITCHED TO SS; UPDATE T-K1/K2 BYTES	~S33	
EQUIPMENT FAILURE OCCURS IN WS TX/RX OF ONU	SW REQ. BY WORKING SF	(ONU) ESTABLISHES ITS ROUTE TO SS	ACK	(OLT) ESTABLISHES ITS ROUTE TO SS	DETECT RR BY RECEIVING K1/K2 BYTES; SL IS SWITCHED TO SS; ROUTER IS SWITCHED TO SS; UPDATE T-K2 BYTE	DETECT RR BY RECEIVING K1/K2 BYTES; ROUTER IS SWITCHED TO SS; SL IS SWITCHED TO SS; UPDATE T-K1/K2 BYTES	~S34	
	SW REQ. BY WORKING SF	(ONU) ESTABLISHES ITS ROUTE TO SS	ACK	(OLT) ESTABLISHES ITS ROUTE TO SS	DETECT RR BY RECEIVING K1/K2 BYTES; SL IS SWITCHED TO SS; ROUTER IS SWITCHED TO SS; UPDATE T-K2 BYTE	DETECT RR BY RECEIVING K1/K2 BYTES; ROUTER IS SWITCHED TO SS; SL IS SWITCHED TO SS; UPDATE T-K1/K2 BYTES	~S35	
EQUIPMENT FAILURE IS RESTORED IN WS TX/RX OF ONU	REQUESTING TO REVERT TO WS	(ONU) ESTABLISHES ITS ROUTE TO SS	ACK	(OLT) ESTABLISHES ITS ROUTE TO SS	DETECT SW REQ. CLEAR; WAIT TO REVERT STATE; UPDATE T-K1 BYTE	START RESTORE TIMER; SL IS OPERATING AT SS	~S51	

FIG. 16

REVERSION WAITING EXPIRES AT OLT	WAITING TO REVERT TO WS	(ONU) ESTABLISHES ITS ROUTE TO SS	NO SW REQ.	(OLT) ESTABLISHES ITS ROUTE TO WS	DETECT SW REQ. CLEAR; WAIT TO REVERT STATE; UPDATE T-K1/BYTE	STOP RESTORE TIMER; ROUTER IS SWITCHED TO WS; NO SW REQ. STATE; UPDATE T-K1/K2 BYTES	~S52
	(ONU) ESTABLISHES ITS ROUTE TO WS	NO SW REQ.		(OLT) ESTABLISHES ITS ROUTE TO WS	DETECT RR BY RECEIVING K1/K2 BYTES; SL IS SWITCHED TO WS; ROUTER IS SWITCHED TO WS; UPDATE T-K1/K2 BYTES	STOP RESTORE TIMER; ROUTER IS SWITCHED TO WS; NO SW REQ. STATE; UPDATE T-K1/K2 BYTES	~S53
	NO SW REQ.			(OLT) ESTABLISHES ITS ROUTE TO WS	DETECT RR BY RECEIVING K1/K2 BYTES; SL IS SWITCHED TO WS; ROUTER IS SWITCHED TO WS; UPDATE T-K1/K2 BYTES	DETECT RR BY RECEIVING K1/K2 BYTES; SL IS SWITCHED TO WS; ROUTER IS SWITCHED TO WS; UPDATE T-K1/K2 BYTES	~S54

FIG. 17

17/26

FAULT STATE	ONU TO OLT			OLT TO ONU			OPERATION	
	K1 BYTE	K2 BYTE	K1 BYTE	K2 BYTE	(OLT)	ONU	OLT	
NO FAILURE	(ONU) ESTABLISHES ITS ROUTE TO WS	NO SW REQ.	(ONU) ESTABLISHES ITS ROUTE TO WS	NO SW REQ.	(OLT) ESTABLISHES ITS ROUTE TO WS	ROUTER AND SL ARE OPERATING AT WS	ROUTER AND SL ARE OPERATING AT WS	~S31
	SW REQ. BY WORKING SF		(ONU) ESTABLISHES ITS ROUTE TO WS		(OLT) ESTABLISHES ITS ROUTE TO WS	DETECT SW REQ. BY WORKING SF; SL IS WORKING AT WS; UPDATE T-K1 BYTE	DETECT SW REQ. BY WORKING SF; SL IS WORKING AT WS; UPDATE T-K1 BYTE	~S32
EQUIPMENT FAILURE OCCURS IN WS TX/RX OF ONU	SW REQ. BY WORKING SF		(ONU) ESTABLISHES ITS ROUTE TO WS	ACK	(OLT) ESTABLISHES ITS ROUTE TO SS	DETECT RR BY RECEIVING K1/K2 BYTES; SL IS WORKING AT WS; UPDATE T-K1 BYTE	DETECT RR BY RECEIVING K1/K2 BYTES; ROUTER IS SWITCHED TO SS; UPDATE T-K1/K2 BYTES	~S33
	SW REQ. BY WORKING SF		(ONU) ESTABLISHES ITS ROUTE TO SS	ACK	(OLT) ESTABLISHES ITS ROUTE TO SS	DETECT RR BY RECEIVING K1/K2 BYTES; SL IS SWITCHED TO SS; ROUTER IS SWITCHED TO SS; UPDATE T-K2 BYTE	DETECT RR BY RECEIVING K1/K2 BYTES; ROUTER IS SWITCHED TO SS; UPDATE T-K1/K2 BYTES	~S34
	SW REQ. BY WORKING SF		(ONU) ESTABLISHES ITS ROUTE TO SS	ACK	(OLT) ESTABLISHES ITS ROUTE TO SS	DETECT RR BY RECEIVING K1/K2 BYTES; SL IS SWITCHED TO SS; ROUTER IS SWITCHED TO SS; UPDATE T-K2 BYTE	DETECT RR BY RECEIVING K1/K2 BYTES; ROUTER IS SWITCHED TO SS; UPDATE T-K1/K2 BYTES	~S35
	DO NOT REVERT TO WS		(ONU) ESTABLISHES ITS ROUTE TO SS	ACK	(OLT) ESTABLISHES ITS ROUTE TO SS	DETECT SW REQ. CLEAR; DO NOT REVERT STATE; UPDATE T-K1 BYTE	DETECT RR BY RECEIVING K1/K2 BYTES; SL IS SWITCHED TO SS	~S36
EQUIPMENT FAILURE IS RESTORED IN WS	DO NOT REVERT TO WS		(ONU) ESTABLISHES ITS ROUTE TO SS	DO NOT REVERT TO WS	(OLT) ESTABLISHES ITS ROUTE TO SS	DETECT SW REQ. CLEAR; DO NOT REVERT STATE; UPDATE T-K1 BYTE	DETECT RR RELEASE BY RECEIVING K1/K2 BYTES; DO NOT REVERT STATE; UPDATE T-K1 BYTE	~S36'

FIG. 18

18/26

	SW REQ. BY STANDBY SD	(ONU) ESTABLISHES ITS ROUTE TO SS	DO NOT REVERT TO WS	(OLT) ESTABLISHES ITS ROUTE TO SS	DETECT SW REQ. BY STANDBY SD; SL IS OPERATING AT SS; UPDATE T-K1 BYTE	DETECT RR RELEASE BY RECEIVING K1/K2 BYTES; DO NOT REVERT STATE; UPDATE T-K1 BYTE	~S37'
SIGNAL DEGRADE OCCURS IN SS TX/RX OF ONU	SW REQ. BY STANDBY SD	(ONU) ESTABLISHES ITS ROUTE TO SS	ACK	(OLT) ESTABLISHES ITS ROUTE TO WS	DETECT SW REQ. BY STANDBY SD; SL IS OPERATING AT SS; UPDATE T-K1 BYTE	DETECT RR BY RECEIVING K1/K2 BYTES; ROUTER IS SWITCHED TO SS; UPDATE T-K1/K2 BYTES	~S38
	SW REQ. BY STANDBY SD	(ONU) ESTABLISHES ITS ROUTE TO WS	ACK	(OLT) ESTABLISHES ITS ROUTE TO WS	DETECT RR BY RECEIVING K1/K2 BYTES; SL IS SWITCHED TO SS; ROUTER IS SWITCHED TO SS; UPDATE T-K2 BYTE	DETECT RR BY RECEIVING K1/K2 BYTES; ROUTER IS SWITCHED TO SS; TO SS; UPDATE T-K1/K2 BYTES	~S39
	SW REQ. BY STANDBY SD	(ONU) ESTABLISHES ITS ROUTE TO WS	ACK	(OLT) ESTABLISHES ITS ROUTE TO WS	DETECT RR BY RECEIVING K1/K2 BYTES; SL IS SWITCHED TO SS; ROUTER IS SWITCHED TO SS; UPDATE T-K2 BYTE	DETECT RR BY RECEIVING K1/K2 BYTES; RECEIVING K1/K2 BYTES; SL IS SWITCHED TO SS	~S40
SIGNAL DEGRADE IS RESTORED IN SS TX/RX OF ONU	NO SW REQ.	(ONU) ESTABLISHES ITS ROUTE TO WS	ACK	(OLT) ESTABLISHES ITS ROUTE TO WS	NO REQ.; UPDATE K1 BYTE	DETECT RR BY RECEIVING K1/K2 BYTES; SL IS SWITCHED TO SS	~S41
	NO SW REQ.	(ONU) ESTABLISHES ITS ROUTE TO WS	NO SW REQ.	(OLT) ESTABLISHES ITS ROUTE TO WS	NO REQ.; UPDATE K1 BYTE	NO REQ.; UPDATE K1 BYTE	~S42

FIG.19

FAULT STATE	ONU TO OLT	OLT TO ONU	ONU	OPERATION
NO FAILURE	K1 BYTE (ONU) ESTABLISHES ITS ROUTE TO WS	K2 BYTE (OLT) ESTABLISHES ITS ROUTE TO WS	K2 BYTE (OLT) ESTABLISHES ITS ROUTE TO WS	ROUTER AND SLARE OPERATING AT WS
SW REQ. BY WORKING SF	(ONU) ESTABLISHES ITS ROUTE TO WS	NO SW REQ.	DETECT SW REQ. BY WORKING SF; SL IS WORKING AT WS; UPDATE T-K1 BYTE	ROUTER AND SLARE OPERATING AT WS
EQUIPMENT FAILURE OCCURS IN WS TX/RX OF ONU	(ONU) ESTABLISHES ITS ROUTE TO WS	ACK	DETECT SW REQ. BY WORKING SF; SL IS WORKING AT WS; UPDATE T-K1 BYTE	DETECT RR BY RECEIVING K1/K2 BYTES; ROUTER IS SWITCHED TO SS; UPDATE T-K1/K2 BYTES
	SW REQ. BY WORKING SF	ACK	(OLT) ESTABLISHES ITS ROUTE TO SS	DETECT RR BY RECEIVING K1/K2 BYTES; SL IS SWITCHED TO SS; ROUTER IS SWITCHED TO SS; UPDATE T-K2 BYTE
SW REQ. BY WORKING SF	(ONU) ESTABLISHES ITS ROUTE TO SS	ACK	(OLT) ESTABLISHES ITS ROUTE TO SS	DETECT RR BY RECEIVING K1/K2 BYTES; SL IS SWITCHED TO SS; ROUTER IS SWITCHED TO SS; UPDATE T-K2 BYTE
REQUESTING TO REVERT WS.	(ONU) ESTABLISHES ITS ROUTE TO SS	ACK	(OLT) ESTABLISHES ITS ROUTE TO SS	DETECT SW REQ. CLEAR; WAIT TO REVERT STATE; UPDATE T-K1 BYTE
EQUIPMENT FAILURE IN WS RX OF ONU IS RESTORED	REQUESTING TO REVERT WS.	REQUESTING TO REVERT TO WS	(OLT) ESTABLISHES ITS ROUTE TO SS	DETECT RR RELEASE BY RECEIVING K1/K2 BYTES; WAIT TO REVERT STATE; START RESTORE TIMER; UPDATE T-K1 BYTE

FIG.20

REVERSION WAITING EXPIRES AT OLT	WAITING TO REVERT TO WS	(ONU) ESTABLISHES ITS ROUTE TO SS	NO SW REQ.	(OLT) ESTABLISHES ITS ROUTE TO WS	DETECT SW REQ. CLEAR; WAIT TO REVERT STATE; UPDATE T-K1 BYTE	STOP RESTORE TIMER; ROUTER IS SWITCHED TO WS; NO SW REQ. STATE; UPDATE T-K1/K2 BYTES	~S52
	NO SW REQ.	(ONU) ESTABLISHES ITS ROUTE TO WS	NO SW REQ.	(OLT) ESTABLISHES ITS ROUTE TO WS	DETECT RR BY RECEIVING K1/K2 BYTES; SL IS SWITCHED TO WS; ROUTER IS SWITCHED TO WS; UPDATE T-K1/K2 BYTES	STOP RESTORE TIMER; ROUTER IS SWITCHED TO WS; NO SW REQ. STATE; UPDATE T-K1/K2 BYTES	~S53
	NO SW REQ.	(ONU) ESTABLISHES ITS ROUTE TO WS	NO SW REQ.	(OLT) ESTABLISHES ITS ROUTE TO WS	DETECT RR BY RECEIVING K1/K2 BYTES; SL IS SWITCHED TO WS; ROUTER IS SWITCHED TO WS; UPDATE T-K1/K2 BYTES	DETECT RR BY RECEIVING K1/K2 BYTES; SL IS SWITCHED TO WS; ROUTER IS SWITCHED TO WS; UPDATE T-K1/K2 BYTES	~S54

FIG.21

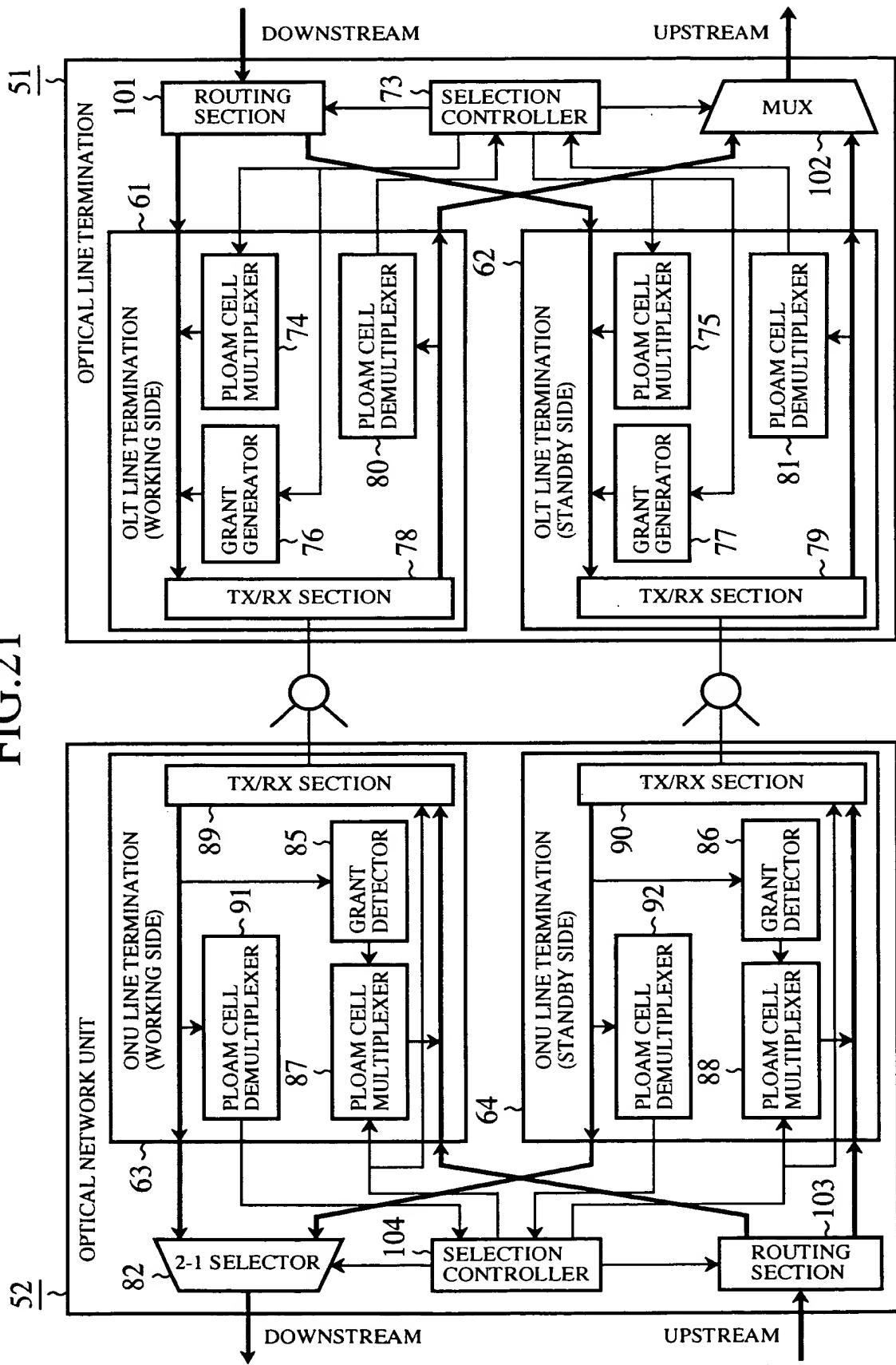


FIG.22

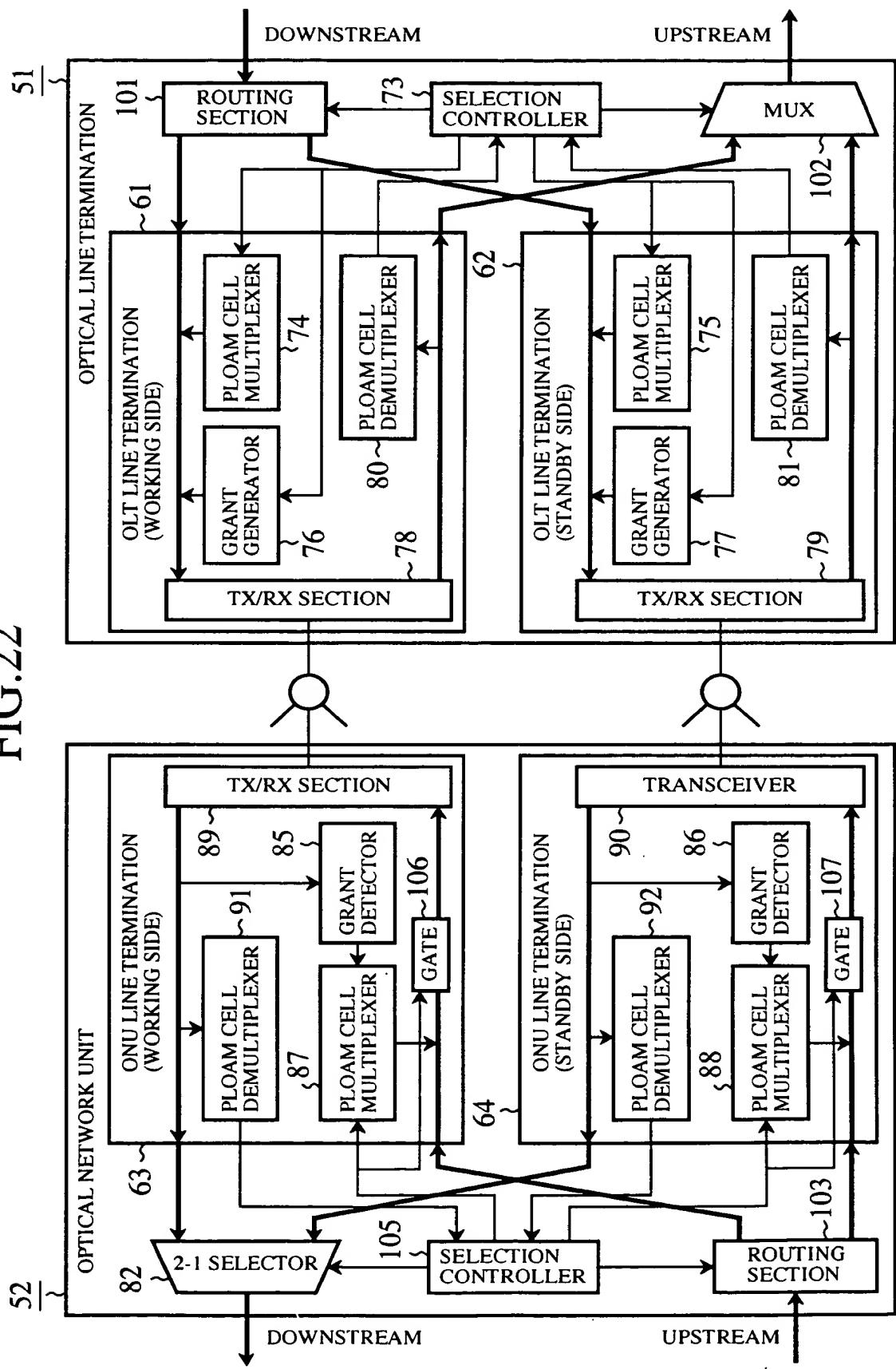


FIG.23

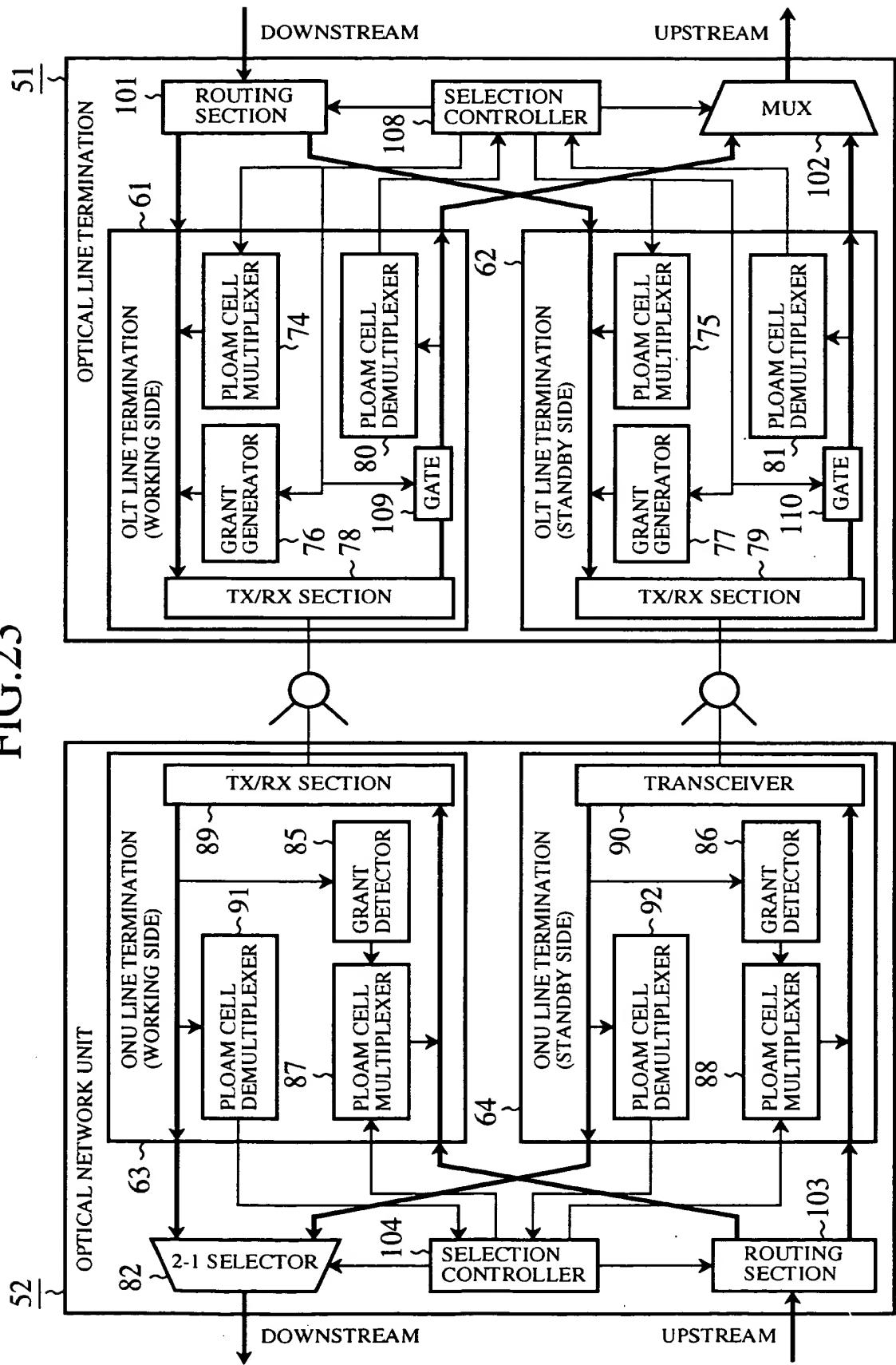


FIG.24 (PRIOR ART)

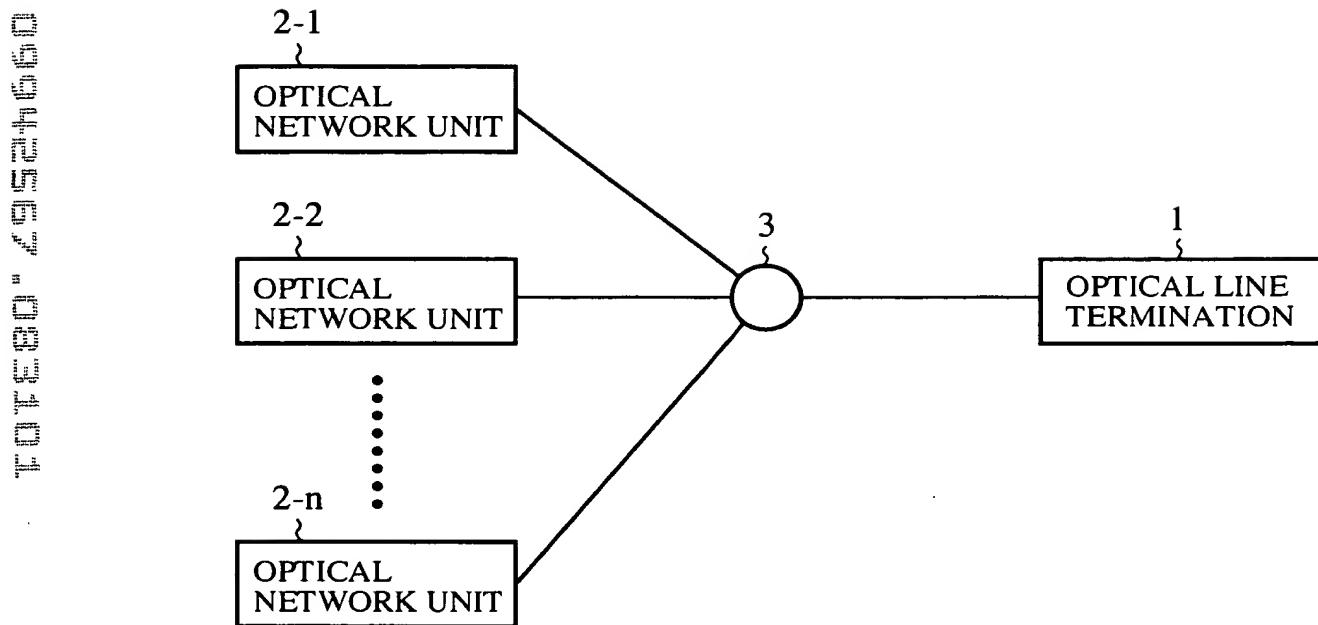
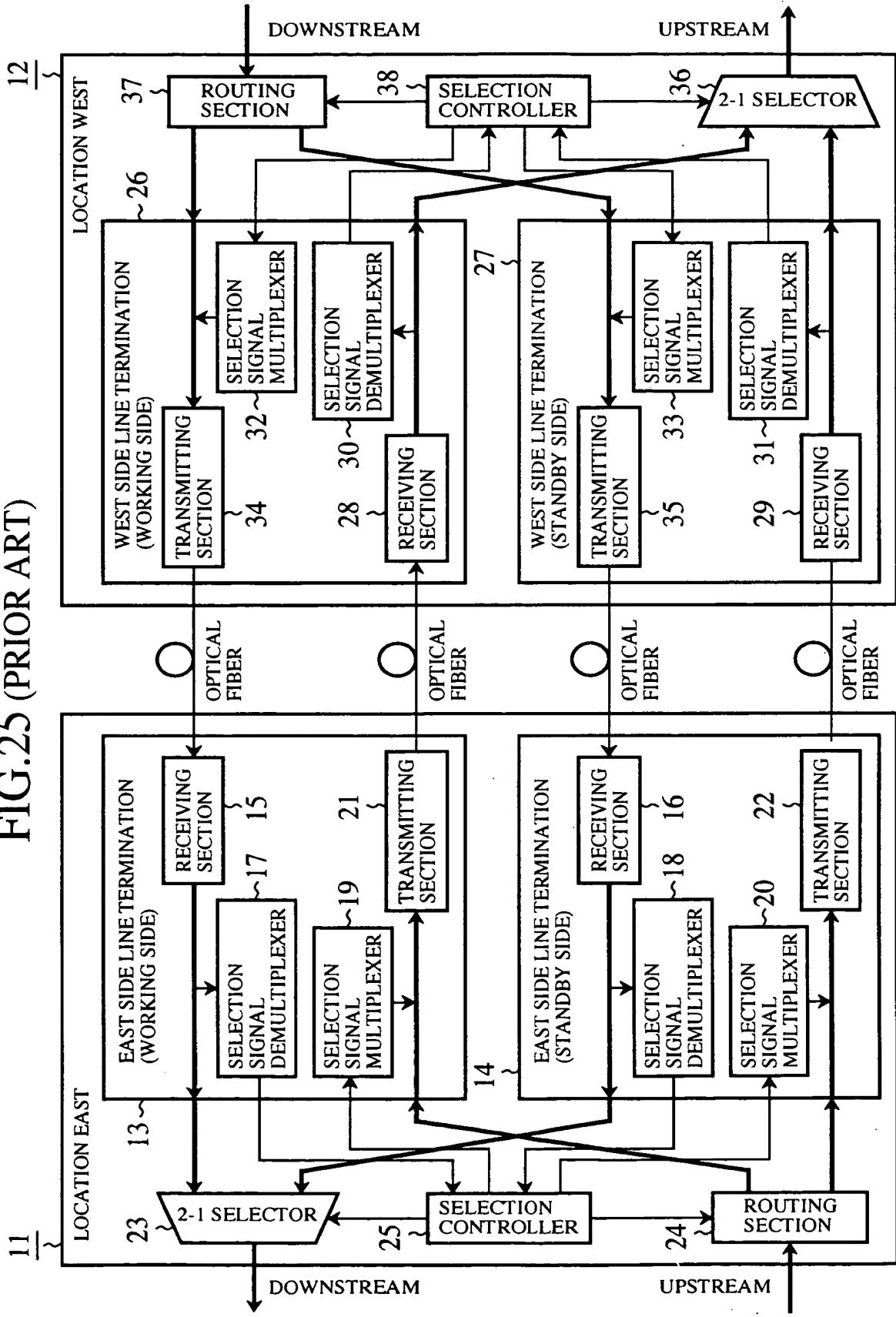


FIG.25 (PRIOR ART)



CONTROL EXAMPLE (NON-REVERTIVE MODE)

FIG.26 (PRIOR ART)

FAULT STATE	LE TO LW			LW TO LE			OPERATION	
	K1 BYTE	K2 BYTE	K1 BYTE	K2 BYTE	LE	LW		
NO FAILURE	NO SW REQ.	(LE IS) SELECTING WS	NO SW REQ.	(LW IS) SELECTING WS	SL IS OPERATING IN WS	SL IS OPERATING IN WS	~S1	
EQUIPMENT FAILURE OCCURS IN WS RX OF LE	SW REQ. BY WORKING SF	(LE IS) SELECTING SS	NO SW REQ.	(LW IS) SELECTING WS	DETECT SW REQ. BY WORKING SF; SL IS SWITCHED TO SS; UPDATE T-K1/K2 BYTES	SL IS OPERATING IN WS	~S2	
EQUIPMENT FAILURE IS RESTORED IN WS RX OF LE	SW REQ. BY WORKING SF	(LE IS) SELECTING SS	NO SW REQ.	(LW IS) SELECTING SS	DETECT SW REQ. BY WORKING SF; SL IS SWITCHED TO SS; UPDATE T-K1/K2 BYTES	DETECT RR BY RECEIVING K1/K2; SL IS SWITCHED TO SS; UPDATE T-K2 BYTE	~S3	
SIGNAL DEGRADE OCCURS IN SS RX OF LE	DO NOT REVERT TO WS	(LE IS) SELECTING SS	NO SW REQ.	(LW IS) SELECTING SS	DETECT SW REQ. CLEAR; DO NOT REVERT STATE; UPDATE T-K1 BYTE	DETECT RR BY RECEIVING K1/K2; SL IS SWITCHED TO SS; UPDATE T-K2 BYTE	~S4	
SIGNAL DEGRADE IS RESTORED IN SS RX OF LE	SW REQ. BY STANDBY SD	(LE IS) SELECTING WS	NO SW REQ.	(LW IS) SELECTING SS	DETECT SW REQ. BY WORKING SD; SL IS SWITCHED TO WS; UPDATE T-K1/K2 BYTES	DETECT RR BY RECEIVING K1/K2; SL IS SWITCHED TO SS; UPDATE T-K2 BYTE	~S5	
	SW REQ. BY STANDBY SD	(LE IS) SELECTING WS	NO SW REQ.	(LW IS) SELECTING WS	DETECT SW REQ. BY WORKING SD; SL IS SWITCHED TO WS; UPDATE T-K1/K2 BYTES	DETECT RR BY RECEIVING K1/K2; SL IS SWITCHED TO WS; UPDATE T-K2 BYTE	~S6	
					NO REQ.; UPDATE K1 BYTE	DETECT RR BY RECEIVING K1/K2; SL IS SWITCHED TO WS; UPDATE T-K2 BYTE	~S7	

NOTE: LE=LOCATION EAST; LW=LOCATION WEST